



U.S. Department of Energy
Office of Inspector General
Office of Audit Services

Audit Report

Savannah River Site's Waste Solidification Building

DOE/IG-IG-0618

September 2003



Department of Energy

Washington, DC 20585

September 4, 2003

MEMORANDUM FOR THE SECRETARY

FROM:


Gregory H. Friedman
Inspector General

SUBJECT:

INFORMATION: Audit Report on "Savannah River Site's
Waste Solidification Building"

BACKGROUND

The Department of Energy's National Nuclear Security Administration (NNSA) plans to spend about \$58 million to design and construct a facility at the Savannah River Site which will treat radioactive liquid wastes. The proposed facility, commonly referred to as the Waste Solidification Building (WSB), will produce several waste forms acceptable for disposal at existing sites around the complex. This effort is a part of the Department's Plutonium Disposition Program. NNSA approved the conceptual design for the WSB in July 2002. Construction is scheduled to begin in December 2004, with expected facility operation beginning in 2007. We conducted this audit to determine whether the Department has a complete plan to dispose of waste generated from the Plutonium Disposition Program.

RESULTS OF AUDIT

While NNSA intended to transfer waste treated at the WSB to the Department's Office of Environmental Management, it had not coordinated its plans with that office. Consequently, Environmental Management's long-range plans did not include disposition of the WSB-treated waste and the Department lacked a cost or schedule baseline for its disposal. Additionally, during the audit, Environmental Management took the position that receiving, processing, and disposing of the waste was NNSA's responsibility. Without an integrated and coordinated plan, the Department's environmental disposition goals may not be achieved and life-cycle costs for the Plutonium Disposition Program are likely to exceed initial estimates.

We are concerned that this may be symptomatic of a broader issue facing the Department. Specifically, the audit disclosed that procedures for disposal of newly generated nuclear wastes from NNSA activities have not been developed. Although our report specifically addresses only one NNSA project, the issue of establishing disposal paths for newly generated wastes has potential consequences for the Department well into the next decade. Consequently, we recommended that NNSA, in coordination with Environmental Management, establish a comprehensive and definitive program for the disposal of NNSA-generated nuclear waste.



Our Special Report on *Management Challenges at the Department of Energy* (DOE/IG-0580, December 2002) identified Environmental Cleanup as one of the most difficult challenges the Department faces. In particular, we discussed the necessity for clearly defined mission requirements and comprehensive plans to meet those needs. In this context, the Department should ensure that it has a fully coordinated approach to the disposition of waste streams from its continuing operations.

MANAGEMENT REACTION

NNSA did not concur with our specific recommendations. NNSA indicated that it was premature to develop a plan and formal agreement to transfer waste from the WSB to Environmental Management, citing uncertainties regarding WSB waste volumes and waste disposal options, along with the fact that the WSB is not scheduled to begin operations until 2007. Also, NNSA provided, as part of its comments, a recent memorandum from the Assistant Secretary for Environmental Management indicating Environmental Management's position that NNSA is responsible for managing and disposing of the radioactive waste generated by its programs. Management's comments have been included as Appendix 3.

The Office of Inspector General agrees that the exact amount of WSB waste was uncertain; however, in our judgment, Savannah River Site waste forecasts provided a sufficient basis to initiate the formal planning process. Moreover, we found that the comments from NNSA and Environmental Management (Appendix 3) reflect very different and, in effect, incompatible positions on this subject. The comments, in fact, tended to reinforce the view that the Department needs to make timely, corporate decisions regarding waste disposal responsibilities.

Attachment

cc: Deputy Secretary
Administrator, National Nuclear Security Administration
Under Secretary for Energy, Science and Environment
Assistant Secretary for Environmental Management
Manager, Savannah River Operations Office

SAVANNAH RIVER SITE'S WASTE SOLIDIFICATION BUILDING

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WASTE DISPOSAL PLAN

Background

The Waste Solidification Building (WSB) is designed to treat two low-level waste streams and two transuranic waste streams produced at Savannah River by the Plutonium Disassembly and Conversion Facility and the Mixed Oxide Fuel Fabrication Facility. The WSB will produce a solid low-level waste form that is acceptable for disposal on-site, and a solid transuranic waste form that is acceptable for shipment and disposal at the Waste Isolation Pilot Plant (WIPP), located near Carlsbad, New Mexico. Additionally, the WSB will generate liquid low-level waste that will be treated at the Effluent Treatment Facility in preparation for disposal in the on-site Saltstone Facility. The processing steps for each stream of waste to be treated include receipt, volume reduction, neutralization, storage, and shipment.

Plan Development

A complete disposal path for waste generated by the WSB has not yet been identified. According to the National Nuclear Security Administration's (NNSA) *Conceptual Design Study* for WSB, the facility is expected to produce about 819,000 gallons of liquid low-level waste, 5,200 drums of solid low-level waste, and 17,000 drums of solid transuranic waste over the 13-year life of the program. The *Conceptual Design Study* further states that, beginning in 2007, the three types of waste will be transferred to Environmental Management, which will further treat or dispose of the waste as specified above. Conversely, Environmental Management's long-range plans, as described in such documents as the Department's *Transuranic Waste Performance Measurement Plan*, contain no specific direction to receive, process, or dispose of the waste produced by the WSB.

We discussed this inconsistency with NNSA and Environmental Management officials both at Savannah River and at Department Headquarters. NNSA's management confirmed that disposition of WSB-generated waste was neither part of, nor contemplated in, the cost and schedule baseline developed for the overall Plutonium Disposition Program. Similarly, Environmental Management officials from Savannah River, as well as an official from the WIPP program office, told us that Environmental Management had no plans in place to receive the WSB waste. They also noted that NNSA had not approached Environmental Management with any requests or proposals on disposing of this waste.

Disposal Agreement

The inconsistency between NNSA's and Environmental Management's plans existed because NNSA had not requested that Environmental Management accept the WSB waste, and the Department had not

established a coordinated program for the disposal of newly generated nuclear wastes from NNSA activities. Recently, the Assistant Secretary for Environmental Management established a program objective for that office to divest its holdings of most nuclear materials by 2006. This is to be achieved by consolidating nuclear materials and transferring custody to the various Lead Program Secretarial Offices. In an October 2002 memorandum on this subject, the Assistant Secretary indicated that no Environmental Management site was to receive or accept responsibility for any additional nuclear materials without her prior approval. At the time of our audit, NNSA had not formally requested that Environmental Management accept the WSB waste.

In response to this audit, the Assistant Secretary for Environmental Management stated that an existing Departmental Order and accompanying manual hold NNSA clearly responsible to plan for disposal of its newly generated nuclear waste. Therefore, it was not necessary for NNSA to formally request Environmental Management acceptance of the WSB waste. Rather, NNSA alone should plan for the disposal of the waste. NNSA disagreed, stating that the Order assigns responsibility for the ultimate disposal of waste to the Assistant Secretary for Environmental Management. In our judgment, the disagreement between NNSA and the Office of Environmental Management over the responsibility for newly generated nuclear waste from NNSA activities emphasizes the importance of establishing a policy that clearly delineates such responsibility.

We noted that in a project with some parallels to WSB, NNSA and Environmental Management formally agreed that wastes generated by the Tritium Extraction Facility at the Savannah River Site would be sent to the Intermediate Level Tritium Vault in the E-area disposal facility with any modification costs to be funded by NNSA. To date, however, such arrangements are made on an ad hoc basis and are not controlled by a standardized policy or procedure.

Cleanup Goals and Cost

The Department's environmental disposition goals may not be achieved if WSB treatment activities are not integrated and coordinated with WIPP and other waste disposal activities. For example, WSB operations could increase the number of shipments of transuranic waste from the Savannah River Site to WIPP by 39 percent and extend the shipping schedule by 7 years. Currently, WIPP expects to receive 1,240 shipments of transuranic waste from the Savannah River Site between 2003 and 2013. However, the WSB will generate an additional 486 shipments between 2007 and 2020. Further, we estimate that it will

cost the Department at least \$5 million above and beyond the Plutonium Disposition Program's projected life-cycle costs to ship WSB-treated transuranic waste to WIPP.

While Savannah River Site's disposal facilities are similarly unprepared for WSB waste, in that they have no plans for its disposal, Environmental Management officials told us that WSB's output of 819,000 gallons of liquid low-level waste and 5,200 drums of solid low-level waste will not have a significant impact on operations.

RECOMMENDATIONS

We recommend that the Administrator, National Nuclear Security Administration:

1. Formally request that Environmental Management accept the waste from the WSB;
2. Develop a complete disposition plan for the WSB waste, to include total life-cycle costs; and,
3. Coordinate with the Assistant Secretary for Environmental Management to: (1) establish procedures for the disposal of newly generated nuclear waste from NNSA activities, thereby ensuring that future plans are fully integrated and coordinated, and (2) issue guidance to field organizations, as appropriate.

MANAGEMENT REACTION

NNSA did not concur with our recommendations. NNSA believes that current waste disposal plans are adequate considering uncertainties inherent at this stage and that it is premature to develop a plan and formal agreement to transfer waste from the WSB to the Office of Environmental Management when the facility will not be operational until 2007. The following specific reasons were cited.

First, the design for the treatment of WSB wastes is currently being developed and the amounts and distribution of wastes to be disposed of are uncertain at this time. To illustrate, NNSA is currently evaluating an option that would eliminate liquid wastes but significantly increase the amount of low-level solid wastes that would need to be dispositioned. This option would eliminate NNSA's need to use the Office of Environmental Management's Effluent Treatment Facility. The exact amount of wastes that will need to be dispositioned from the WSB will be defined at the completion of the preliminary design sometime this summer and the WSB performance baseline, established at that time, will include the total life-cycle cost.

However, as part of the conceptual design planning process, estimates were prepared of the amounts of wastes that would need to be disposed of during operations. Since the disposal paths for the WSB wastes employ well-established technologies currently in use at Savannah River and waste estimates are expected to be well within current capabilities, NNSA has the highest confidence that the wastes can be disposed of. Finally, the estimated amounts of wastes to be disposed of appear in Savannah River site waste forecasts so that they will not be overlooked.

As noted, the Assistant Secretary for Environmental Management ascribes to the view that NNSA alone has responsibility for WSB-generated waste.

Both NNSA's and Environmental Management's comments can be found in Appendix 3.

AUDITOR COMMENTS

The disparate positions taken by NNSA and Environmental Management emphasize the need for formal development of a complete disposition plan for WSB waste and coordination among the affected offices. While the exact amounts and distribution of WSB wastes are not yet known, the characteristics of the waste are known and preliminary estimates of waste volumes have been prepared and can be used to begin the formal planning process with Environmental Management. Additionally, the WSB life-cycle costs should be finalized as soon as possible. Although the WSB is not expected to commence operations until 2007, initiating the formal planning process could reduce the chances that the project will encounter significant delays.

For example, NNSA has already had to significantly rescope the project due to the lack of availability of Office of Environmental Management facilities. Specifically, NNSA's original plan to transfer waste from the project directly to the High Level Waste Tanks had to be abandoned due to the fact that the Office of Environmental Management planned to close the tanks prior to the project's completion. Finally, while NNSA still has various options for disposing of WSB waste, it is apparent that some portion of the waste will have to go to the Office of Environmental Management. For example, the transuranic waste component of the WSB will have to be sent to the Office of Environmental Management's WIPP.

PRIOR REPORTS

- *The Department of Energy's Strategy for Disposal of Plutonium* (ER-L-02-01, February 2002). The Department's original approach for the disposal of plutonium – immobilizing 8.4 metric tons of plutonium and converting 25.6 metric tons to fuel – is estimated to cost about \$6.3 billion. In contrast, we estimated that converting all 34 metric tons to reactor fuel would cost about \$4.6 billion and immobilizing all the material would cost about \$4.3 billion. Department officials originally believed that converting all of the plutonium into fuel was not technically feasible and the Russian Federation would reject a proposal to immobilize the entire amount. However, the Department had since resolved the technical feasibility issues surrounding conversion. The audit disclosed that the Department could save at least \$1.7 billion by converting all of the surplus plutonium into fuel and avoiding the cost of plutonium immobilization.
- *The Plutonium Immobilization Plant at the Savannah River Site* (IG-0522, September 2001). The audit determined that the proposed Plutonium Immobilization Plant potentially overlapped with the capability of Savannah River Site's FB Line Facility, and could duplicate the capability of the Treatment and Storage Facility, which was scheduled to be operational in September 2008. The Department's Office of Fissile Materials Disposition had not considered the FB Line Facility or the Treatment and Storage Facility as alternatives for disposing of excess plutonium. We estimated that the Department could save \$650 million if it used existing or planned facilities, rather than build the Plutonium Immobilization Plant.

Appendix 2

OBJECTIVE

The objective of the audit was to determine whether the Department of Energy has a complete plan to dispose of waste generated from the Plutonium Disposition Program.

SCOPE

The audit was performed from July 9, 2002, to December 13, 2002, at the Savannah River Site in Aiken, South Carolina. The audit included a review of the Department's plans for disposal of radioactive waste generated from the Plutonium Disassembly and Conversion Facility and the Mixed Oxide Fuel Fabrication Facility.

METHODOLOGY

To accomplish the audit objective, we:

- Researched Department directives regarding project management and disposal of radioactive waste;
- Analyzed the *Conceptual Design Study for the Plutonium Disposition Facilities Waste Solidification Building* (July 2002);
- Reviewed additional studies, cost estimates, and schedules for the disposition of liquid waste streams from the Plutonium Disposition Program;
- Assessed compliance with the Government Performance and Results Act of 1993; and,
- Interviewed National Nuclear Security Administration and Office of Environmental Management personnel to identify and evaluate the Department's plans for disposal of radioactive waste from the Plutonium Disposition Program.

The audit was performed in accordance with generally accepted Government auditing standards for performance audits and included tests of internal controls and compliance with laws and regulations to the extent necessary to satisfy the audit objective. Accordingly, we assessed internal controls and performance measures related to the planned disposal of waste from the Plutonium Disposition Program. Because our review was limited, it would not necessarily have disclosed all internal control deficiencies that may have existed at the time of our audit. We did not conduct a reliability assessment of computer-processed data because only a very limited amount of computer-processed data was used during the audit.

The Director, Policy and Internal Controls Management, Office of Business Operations, waived the exit conference.



Department of Energy
National Nuclear Security Administration
Washington, DC 20585

JUN 18 2003

MEMORANDUM FOR Frederick D. Doggett
Deputy Assistant Inspector General
for Audit Services

FROM: Michael C. Kane 
Acting Associate Administrator
for Management and Administration

SUBJECT: Response to Draft Report on Waste Solidification
Building

The Office of Inspector General (IG) conducted an audit of the planned Savannah River Site's Waste Solidification Building to determine whether the Department has a complete plan to dispose of waste generated from the Plutonium Disposition Program. The draft report indicates that the IG believes that the plan for Plutonium Disposition Program waste is incomplete in that National Nuclear Security Administration (NNSA) plans to transfer the waste treated at the solidification building to Environmental Management, but Environmental Management has no corresponding plans to receive, process, and dispose of the waste. The report further indicates that the IG believes that a path forward does not exist because there is no established policy for disposal of newly generated nuclear wastes from NNSA activities.

NNSA believes that it is premature to develop a plan to transfer waste from the future Waste Solidification Building to the Office of Environmental Management for several reasons. First, the requirements for the preliminary design of the Waste Solidification Building are evolving to account for uncertainties regarding infrastructure support at the Savannah River Site during the time the plutonium disposition facilities will be operational. Second, the Waste Solidification Building is not scheduled to begin operations until 2007. Third, the transfer of treated waste to the Office of Environmental Management is one of several options under NNSA consideration. Current NNSA plans do not depend on Savannah River Site support for the Waste Solidification Building. Consequently, there is no need for a plan and formal agreement with the Office of Environmental Management at this time for the transfer of waste. However, at some appropriate time in the future, NNSA intends to initiate discussion with the Office of Environmental Management to explore ways in which the two programs can cooperate on ways to reduce costs.



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Appendix 3 (continued)

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With regard to established policy for waste, The Assistant Secretary for Environmental Management, in comments provided to the Administrator, disagrees that there is no established policy for disposal of newly generated nuclear wastes from NNSA activities. The Assistant Secretary states that the existing policy is embodied within a DOE order and accompanying manual and provides clear responsibility for NNSA and its field element managers to plan for disposal of newly generated nuclear waste from NNSA activities. NNSA, however, disagrees with the Assistant Secretary for Environmental Management interpretation of the DOE Order with regard to NNSA activities. NNSA's view is that the DOE Order assigns responsibility for ultimate disposal of waste to the Assistant Secretary for Environmental Management and not NNSA.

We appreciate the work that the IG has done as well as the opportunity to have reviewed the draft report. I have attached, for your review, a copy of the memorandum from the Assistant Secretary of Environmental Management to the Administrator which provides comments to the IG's draft report. I have also attached a copy of the technical comments generated by the NNSA cognizant program office. We appreciate having had the opportunity to review the draft report.

Should you have any questions, please contact Richard Speidel, Director, Policy and Internal Controls Management at 586-5009.

Attachments

cc: Deputy Administrator for Defense Nuclear Nonproliferation, NA-20
Assistant Secretary for Environmental Management, EM-1
David Marks, Field Chief Financial Officer, SvcCen/NV

Appendix 3 (continued)



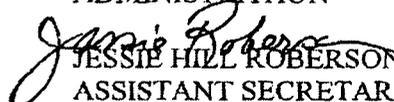
Department of Energy

Washington, DC 20585

May 15, 2003

MEMORANDUM FOR AMBASSADOR LINTON F. BROOKS
UNDER SECRETARY AND ADMINISTRATOR
NATIONAL NUCLEAR SECURITY
ADMINISTRATION

FROM


JESSIE HILL ROBERSON
ASSISTANT SECRETARY FOR
ENVIRONMENTAL MANAGEMENT

SUBJECT

Comments on the Office of Inspector General's *Draft
Audit Report: Savannah River Site's Waste Solidification
Building*

The purpose of this memorandum is to provide comments from the Office of Environmental Management (EM) on the Inspector General (IG) recommendations contained in the subject draft report. The draft recommendations are directed to the National Nuclear Security Administration (NNSA), but, as currently worded, also are of interest to and have an impact on EM.

Department of Energy (DOE) Order 435.1, *Radioactive Waste Management*, and its associated manual, provide requirements for DOE and NNSA to follow in managing radioactive waste. Section I.2.A of the manual specifies that "Program Secretarial Officers with radioactive waste management facilities, operations, or activities are responsible within their respective programs for ensuring that the Field Element Managers meet the requirements of DOE O 435.1, *Radioactive Waste Management*, and this Manual."

The draft IG recommendations should be reworded to recognize this policy – that is, that NNSA is responsible for managing and disposing of the radioactive waste generated by its programs.

Therefore, the following comments are provided for two of the three draft IG recommendations:

1. Reword Recommendation # 1 ("Formally request that Environmental Management accept the waste from the WSB [Waste Solidification Building].") to now read, "Formally plan for the disposal of newly generated nuclear waste from the WSB."



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2. Delete Recommendation # 3 (“Coordinate with the Assistant Secretary for Environmental Management to establish a policy for the disposal of newly generated nuclear waste from NNSA activities, thereby ensuring that future plans are fully integrated and coordinated. If necessary, elevate the establishment of this policy to the Deputy Secretary.”). The existing policy embodied within DOE O 435.1 and its manual provides clear responsibility for NNSA and its field element managers to plan for disposal of newly generated nuclear waste from NNSA activities. No further policy development is required.

If you have any further questions, please call me at (202) 586-7709 or Ms. Patrice M. Bubar, Associate Deputy Assistant Secretary for Integration and Disposition, at (202) 586-5151.

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